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Whole-tree harvest — nutrient relationships: a bibliography/Exploitation des arbres entiers — rapport des éléments nutritifs: étude bibliographique

J.P. Kimmins, D. Binkley, L. Chatarpaul, J. de Catanzaro

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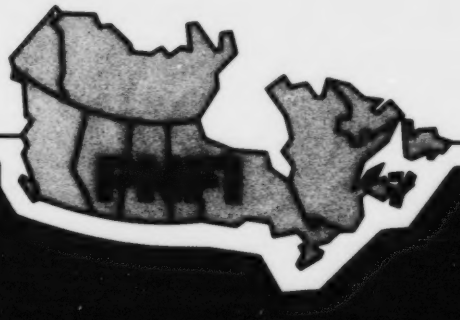

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WHOLE-TREE HARVEST - NUTRIENT RELATIONSHIPS: A BIBLIOGRAPHY/ EXPLOITATION DES ARBRES ENTIERS - RAPPORT DES ÉLÉMENTS NUTRITIFS: ÉTUDE BIBLIOGRAPHIQUE

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This report is based on ENFOR project P-197 which was carried out under contract (DSS File No. KL011-1-0021) by the Canadian Forestry Service and the University of British Columbia.

ENFOR is the acronym for the Canadian Government's ENergy from the FORest (ENergie de la FORêt) program of research and development aimed at securing the knowledge and technical competence to facilitate, in the medium to long term, a greatly increased contribution from forest biomass to our nation's primary energy production. This program is part of a much larger federal government initiative to promote the development and use of renewable energy as a means of reducing dependence on petroleum and other non-renewable energy sources.

The Canadian Forestry Service (CFS) administers the ENFOR Biomass Production program component which deals with such forest-oriented subjects as inventory, harvesting technology, silviculture, and environmental impacts. (The other component, Biomass Conversion, deals with the technology of converting biomass to energy or fuels, and is administered by the Renewable Energy Branch of the Department of Energy, Mines, and Resources). Most Biomass Production projects, although developed by CFS scientists in the light of ENFOR program objectives, are carried out under contract by forestry consultants and research specialists. Contractors are selected in accordance with science procurement tendering procedures of the Department of Supply and Services. For further information on the ENFOR Biomass Production program, contact

ENFOR Secretariat
Canadian Forestry Service
Ottawa, Ontario
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or a CFS research laboratory.

Le présent rapport a été rédigé suite à l'étude ENFOR P-197 qui a été réalisée à contrat (dossier MAP: KL011-1-0021) par le Service canadien des forêts et l'Université de la Colombie-Britannique.

ENFOR est l'acronyme employé pour désigner le programme de recherche et de développement ENergie de la FORêt (ENergy from the FORest) du gouvernement canadien dont l'objectif est d'acquérir des connaissances et des compétences techniques pour faciliter à moyen et à long terme un accroissement important de l'utilisation de la biomasse forestière pour la production d'énergie au pays. Ce programme fait partie d'une initiative beaucoup plus vaste du gouvernement fédéral en vue de favoriser l'exploitation et l'utilisation des formes d'énergie renouvelables de façon à réduire la dépendance vis-à-vis le pétrole et d'autres sources d'énergie non renouvelables.

Le Service canadien des forêts (SCF) est responsable de la partie du programme consacrée à la production de biomasse où l'on se penche sur des questions intéressant la forêt telles que les inventaires, les techniques de récolte, la sylviculture et les incidences environnementales. (L'autre partie du programme, intitulée "Transformation de la biomasse", porte sur les techniques de transformation de la biomasse en énergie ou en combustibles; elle est la responsabilité de la Direction des énergies renouvelables du ministère de l'Énergie, des Mines et des Ressources.) La plupart des études sur la production de la biomasse, même si elles ont été élaborées par des scientifiques du SCF compte tenu des objectifs du programme ENFOR, sont réalisées à contrat par des consultants en foresterie et des chercheurs spécialistes. Les contrats sont octroyés conformément aux méthodes suivies par le ministère des Approvisionnements et Services pour les marchés scientifiques. On peut obtenir plus d'informations sur le sous-programme de production de la biomasse en s'adressant à un laboratoire de recherche du SCF ou en écrivant à l'adresse suivante:

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PREFACE

The scientific literature focusing on nutrient cycling in temperate forests has expanded tremendously in the past two decades. Scientists, students, and forest managers face a monumental challenge in keeping up with this literature. We addressed this challenge by compiling an exhaustive bibliography of several thousand references arranged by major nutrient cycling categories. The bibliography was designed as a component of a larger project funded under the ENFOR program of the Canadian Forestry Service. This project had the goal of incorporating nutrient cycling aspects into forest utilization plans. The first step in this project was the development of the FORCYTE (FORest Nutrient CYcling Trend Evaluator) simulation model of forest productivity and nutrient cycling (Kimmins and Scoullar 1984). To assist in the dissemination and use of the FORCYTE model, we also compiled extensive data tables from temperate forests around the world (Kimmins et al. 1985). This bibliography was the third step, aimed at facilitating research and application of nutrient cycling concerns in forest productivity by providing a central source for entry into the vast literature.

We used two major sources for our entries. Computerized abstract services contain databases which extend back to the early 1970s and, therefore, many of our entries from 1975 onward were obtained from computer searches of 'Forestry Abstracts' and 'Biological Abstracts'. For older references, we used key articles in each subject area and worked backwards from lists of cited literature. Our last computer search was in July of 1982; thus the bibliography contains only a few entries more recent than 1981.

We organized the entries by four subject categories: nutrient cycling, biomass, nutrient content of biomass, and computer simulation models. Subdivisions of these main categories allow more specific searches. The assignment of a reference to the most appropriate category was somewhat subjective because many entries matched more than one of our divisions. For example, a study of decomposition which included both overstorey and understorey species would be grouped in the general category of "Decomposition" rather than be listed separately in each sub-category. In another case, a study might include information on both forest biomass and nutrient content, and so be listed in both sections. Entries which warranted inclusion in more than two groups usually were listed just once in the "Total Systems Studies, Cycles of Elements" group. Therefore, a complete survey of the bibliography would start with the most specific category (such as "Forest Floor"), move up to a more general level (such as "Biomass" or "Nutrient Content") and finish off by checking the catch-all category of "Total Systems Studies." Authors are listed alphabetically under each category.

Although we attempted to be exhaustive in our compilation, many valuable citations undoubtedly slipped through our searches. In the event that we produce an updated second edition, we would welcome any new citations, especially those before 1980. These should be sent to J.P. Kimmins, Faculty of Forestry, University of British Columbia, Vancouver, B.C. V6T 1W5, or any of the co-authors.

PRÉFACE

Au cours des deux dernières décennies, le corpus des publications scientifiques sur le cycle des éléments nutritifs dans les forêts tempérées s'est considérablement enrichi. Les scientifiques, les étudiants et les aménagistes doivent maintenant relever le défi monumental de surnager dans cette mer d'information. Nous avons voulu les y aider en dressant la bibliographie exhaustive de plusieurs milliers de références classées selon les principales catégories intéressant le cycle des éléments nutritifs. Cette bibliographie a été conçue pour faire partie d'un projet plus vaste, financé grâce au programme ENFOR du Service canadien des forêts et qui est d'incorporer les aspects du cycle des éléments nutritifs dans les plans d'utilisation des forêts. La première étape du projet a été la construction du modèle de simulation FORCYTE (FORest Nutrient CYcling Trend Evaluator) qui permet d'évaluer les tendances de la productivité forestière et du cycle des éléments nutritifs (Kimmins et Scoullar, 1984). Pour aider la dissémination et l'utilisation du modèle, nous avons dressé des tableaux complets de données sur les forêts tempérées du globe (Kimmins et coll., 1985). La présente bibliographie constitue la troisième étape, dont l'objet est de faciliter la recherche sur les aspects concernant le cycle des éléments nutritifs et l'application de ces derniers à la productivité forestière en permettant d'accéder au corpus des publications grâce à une porte centrale.

Nos vedettes sont tirées de deux sources principales. Les services de rédaction de résumés informatisés sont constitués des bases de données qui remontent jusqu'au début des années 70, de sorte que beaucoup de nos vedettes depuis 1975 ont été obtenues par dépouillement informatisé des <<Forestry Abstracts>> et des <<Biological Abstracts>>. Pour les références antérieures, nous avons utilisé les articles clés de chaque domaine et remonté dans le temps à partir de listes d'ouvrages cités. Comme notre dernière recherche documentaire s'est faite en juillet 1982, la bibliographie ne contient que peu de vedettes ultérieures à 1981.

Nous avons subdivisé les vedettes entre quatre catégories de sujets: le cycle des éléments nutritifs, la biomasse, la teneur de la biomasse en éléments nutritifs et les modèles informatisés de simulation.

La subdivision de ces grandes catégories permet des recherches plus précises. La catégorisation des sources de références a été quelque peu subjective, car beaucoup de vedettes pouvaient entrer dans plus d'une de nos subdivisions. Par exemple, une étude de la décomposition qui porte à la fois sur les espèces de l'étage dominant et de l'étage dominé serait classée dans la catégorie générale <<décomposition>> plutôt que d'être classée séparément dans chaque sous-catégorie. D'autre part, une étude peut renfermer des renseignements à la fois sur la biomasse forestière et sur la teneur en éléments nutritifs et ainsi figurer sous ces deux rubriques. Les vedettes dont l'inclusion dans plus de deux catégories était indiquée ont habituellement été énumérées une seule fois, dans la catégorie <<études des systèmes d'ensemble, cycles et éléments>>. Par conséquent, pour une exploration complète de la bibliographie, il faudrait commencer par la catégorie la plus précise (par exemple, <<sol forestier>>), remonter à un niveau plus général (par exemple, <<biomasse>> ou <<teneur en éléments nutritifs>>), pour terminer

par la catégorie la plus générale <<études des systèmes d'ensemble>>. Les auteurs sont énumérés par ordre alphabétique, dans chaque catégorie.

Malgré notre souci de ne rien oublier dans nos compilations, beaucoup de citations précieuses nous ont inévitablement échappé. Si jamais nous produisons une deuxième édition à jour, nous accueillerons toutes les nouvelles citations, notamment celles qui sont antérieures à 1980. Nous invitons les lecteurs à les signaler à l'attention de J.P. Kimmins, Faculté de foresterie, Université de la Colombie-Britannique, Vancouver (C.-B.) V6T 1W5, ou aux autres auteurs.

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*** Nutrient Content ***
*** Aboveground overstory - hardwoods ***

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